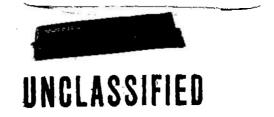
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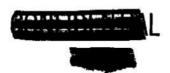
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(SUMMARY ECHNICAL REPORT OF NDRC)

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NOTES ON THE OF ANIZATION OF NDRC

The duties of the National Defense Research Commitse were (1) to recommend to the Director of OSRD suitzle projects and research programs on the instrumentalies of warfare, together with contract facilities for car/ing out these projects and programs, and (2) to admisster the technical and scientific work of the contracts More specifically, NDRC functioned by initiating resears projects on request from the Army or the Navy, c on requests from an allied government transmittedthrough the Liaison Office of OSRD, or on its own condered initiative as a result of the experience of its meibers. Proposals prepared by the Division, Panel, or Committee for research contracts for performance of the wrk involved in such projects were first reviewed by NDIC, and if approved, recommended to the Director of JSRD. Upon approval of a proposal by the Director, . contract permitting maximum flexibility of scientifi effort was arranged. The business aspects of the coatract, including such matter as materials, clearances, ouchers, patents, priorities, legal matters, and adminicration of patent matters were handled by the ExecutiveSecretary of OSRD.

Originally NDRC administered is work through five divisions, each headed by one of ne NDRC members. These were:

Division A – Armor and Ordnance

Division B - Bombs, Fuels, Gases, & Chemical Problems

Division C - Communication and Transportation

Division D - Detection, Controls, and Instruments

Division E - Patents and Inventions

In a reorganization in the fall of 1942, twenty-three administrative divisions, panels, or committees were created, each with a chief selected on the basis of his outstanding work in the particular field. The NDRC members then became a reviewing and advisory group to the Director of OSRD. The final organization was as follows:

Division 1 - Ballistic Research

Division 2 - Effects of Impact and Explosion

Division 3 - Rocket Ordnance

Division 4 - Ordnance Accessories

Division 5 - New Missiles

Division 6 - Sub-Surface Warfare

Division 7 - Fire Control

Division 8 - Explosives

Division 9 - Chemistry

Division 10 - Absorbents and Aerosols >

Division 11 - Chemical Engineering

Division 12 - Transportation -

Division 13 — Electrical Communication

Division 14 -- Radar --

Division 15 - Radio Coordination

Division 16 - Optics and Camouflage

Division 17 — Physics

Division 18 – War Metallurgy

Division 19 - Miscellaneous

Applied Mathematics Panel

Applied Psychology Panel

Committee on Propagation

erioration Administrative Committee

NDRC FOREWORD

s events of the years preceding 1940 revealed A more and more clearly the seriousness of the world situation, many scientists in this country came to realize the need of organizing scientific research for service in a national emergency. Recommendations which they made to the White House were given careful and sympathetic attention, and as a result the National Defense Research Committee (NDRC) was formed by Executive Order of the President in the summer of 1940. The members of NDRC, appointed by the President, were instructed to supplement the work of the Army and the Navy in the development of the instrumentalities of war. A year later, upon the establishment of the Office of Scientific Research and Development (OSRD), NDRC became one of its units.

The Summary Technical Report of NDRC is a conscientious effort on the part of NDRC to summarize and evaluate its work and to present it in a useful and permanent form. It comprises sixty-eight volumes broken into groups corresponding to the NDRC Divisions, Panels, and Committees.

The Summary Technical Report of each Division, Panel, or Committee is an integral survey of the work of that group. The first volume of each group's report contains a summary of the report, stating the problems presented and the philosophy of attacking them, and summarizing the results of the research, development, and training activities undertaken. Some volumes may be "state of the art" treatises covering subjects to which various research groups have contributed information. Others may contain descriptions of devices developed in the laboratories.

Some of the NDRC-sponsored researches which had been declassified by the end of 1945 were of sufficient popular interest that it was found desirable to report them in the form of monographs, such as the series on radar by Division 14 and the monograph on sampling inspection by the Applied Mathematics Panel. Since the material treated in them is not duplicated in the Summary Technical Report of NDRC, the monographs are an important part of the story of these aspects of NDRC research.

In contrast to the information on radar, which is of widespread interest and much of which is released to the public, the research on subsurface warfare is largely classified and is of general interest to a more restricted group. As a consequence, the report of Division 6 is found almost entirely in its Summary Technical Report, which runs to 24 volumes. The extent of the work of a division cannot therefore be judged solely by the number of volumes devoted to it in the Summary Technical Report of NDRC: account must be taken of the monographs and available reports published elsewhere.

This master subject index volume is a consolidation of all the subject matter included in the individual indexes of all these divisional, panel, and committee reports, which together constitute the Summary Technical Report of NDRC.

It is therefore fitting that a roll of OSRD appointees should also appear in this volume. Here are listed the names of those who cooperated with such loyalty and brilliance in the defense of their country. Their contributions to victory, while serving in their various appointments under OSRD, are summarized in the Summary Technical Report volumes. While it is impossible to pay tribute individually to each of their many achievements, it is desired to express here to all of them, on behalf of the Nation, our warmest gratitude and appreciation.

In addition, it is appropriate to acknowledge here the work of the Summary Reports Group (SRG), in which responsibility for the production of the entire Summary Technical Report was vested. In another place in this volume, the operation of the group is reviewed, so that something of the magnitude of its task and the multiplicity of its problems can be appreciated.

In just over three years SRG completed its assignment in producing the sixty-eight STR volumes and two index volumes. That this time compares favorably with the work of long-established publishing houses, should reflect to the credit of SRG's staff. The carefully prepared and edited information in these volumes is of vital importance, and it is only fitting that our thanks should be expressed to SRG for its work in making this information available in a permanent and presentable form.

Vannevar Bush, Director
Office of Scientific Research and Development

J. B. Conant, Chairman National Defense Research Committee





SUMMARY REPORTS GROUP FOREWORD

At some future time, another organization may be confronted with an assignment similar to that of the Summary Reports Group. It has therefore been suggested that at some place in these volumes a brief outline of the operational procedures of the group be given, in the hope that useful information will be afforded to interested parties. This volume, since it is to serve as the index for all the STR volumes, would appear to be the most logical place for such an outline, and therefore, this Foreword is largely a short but objective history of SRG.

The preparation and publication of the Summary Technical Report of NDRC has been the main responsibility of the Summary Reports Group. During the early phases of this work, OSRD defined the Summary Technical Report as a series of uniform volumes summarizing, for a technically trained group of readers, the scientific program of NDRC. It was to be a classified report to the Army and Navy in fulfilment of the final obligations of NDRC. In addition to the Services, the furnishing of copies of the STR was also authorized to the British Commonwealth Scientific Office and to the Library of Congress.

Even while the utmost energics of OSRD were still committed to the prosecution of wartime research, the necessity for the eventual publication of an STR was apparent to Dr. Vannevar Bush and his colleagues. Accordingly, on August 9, 1944, he officially authorized the project and on August 17 the Executive Secretary, Dr. Irvin Stewart, sent out a memorandum to all Division and Panel Chiefs and Committee Chairmen, requesting that they start making plans for the preparation of manuscript. Dr. K. H. Condit of NDRC was appointed Special Consultant, and further memoranda were issued by him, giving more explicit instructions on the scope, contents and mechanics of preparation for the volumes.

The first unit to commence work on its portion of the STR was Division 6, and to handle this project the Summary Reports Group (Contract OEMsr-1131) was formed, under the Columbia University Division of War Research, on March 1, 1945. Dean George B. Pegram, Chairman of CUDWR, gave his wholehearted interest and support to the work, which was at first directed by Dr. Edwin H. Colpitts, Chief of Section 6.1 of Division 6. After discussions on style and format had been settled, a style guide was pre-

pared; this was later distributed to printers and division editors as a guide for all the STR volumes.

Upon the ending of hostilities in August 1945, and the consequent rapid transition of the majority of NDRC personnel to peacetime pursuits, it became apparent that unless SRG were charged with the task of producing all the STRs, many of them would go by default. Accordingly, on August 30, 1945, a conference was held in Washington, under the chairmanship of Dr. H. M. Chadwell, to plan the future of the project. Representatives of SRG and of most of the Divisions, Committees and Panels of NDRC were present. During the meeting, editors were nominated for those volumes not yet started, and matters of editorial style and policy were discussed. A flow sheet for the handling of manuscript and proofs, and a system for the preparation of art were established.

After the conference, the Group had a clearer conception of the magnitude of its assignment and the various procedures involved, from the drafting of the rough manuscript to the delivery of the bound volumes to the Services. Accordingly, the staff was enlarged to meet the requirements of its tasks, and several new departments with specific functions were formed. At its maximum, the office staff numbered 86 persons. The first major problem confronting the group was the enlistment of printing facilities for the seventy volumes. This was originally intended to be the responsibility of the Government Printing Office, but since this office was already committed to other high priority work, a separate printing contract with the Treasury Department (Tps-74199), was awarded to Columbia University Press, who planned to have all the STRs printed by one New York firm. A further modification in the printing arrangements was necessary when it became apparent that no one firm would be able to complete the assignment within a reasonable space of time. Accordingly, with CU Press approval and cooperation, SRG sought for and finally contacted additional printers in New York, Boston, Chicago, Philadelphia and even California, who were willing and able to print the balance of the volumes. Since most printing houses were at that time inundated with orders, this was by no means a simple problem; it was further complicated by the fact that only firms cleared for the handling of classified material could be given the work. Even after the services

of printers had been procured, much additional responsibility for SRG, unanticipated at the start, was entailed in maintaining the utmost pressure on them and in following up printing and make-up instructions.

In its three years of existence, the Group has been faced with many other difficulties: the paper shortage, the security question, the lack of trained personnel, the poor condition of hastily prepared manuscripts, the highly technical nature of the material itself-these are only some of the problems. That the job could be performed more expeditiously and efficiently were it to be undertaken again goes without saying; it must be remembered that the Group was unique in the character and magnitude of its assignment, and that consequently a certain number of mistakes were inevitable. That the work was completed successfully is largely due to the integrity of the majority of the staff, and the enthusiasm with which they tackled their many problems. In order that SRG's approach to these problems may be better appreciated, a description of the various departments follows.

As already mentioned, the original assignment of SRG was the preparation of the Division 6 STR. When, after the August 1945 meeting, SRG's responsibilities were extended to all the STRs, a separate Division 6 Department was formed to continue the editing and writing of that unit's twenty-four volumes. This work was headed by John S. Coleman, one of the Assistant Directors of SRG.

A Liaison Department was created to maintain contact with the Division authors and editors in an effort to expedite the completion of manuscript, and the return of galley proofs and cut dummies sent out for a technical reading. In addition, this department, established by Milton Silverman and later under Kathryn Setze, was responsible for the writing of the entire Division 12 STR, and the compilation of the three Committee on Propagation STR volumes from previous report and conference material. In the later phases of the project, the liaison work for the Division 6 volumes, mainly consisting of the handling of galley and page proof for these books, became another of the responsibilities of Liaison Department.

For the formidable tasks of editing the manuscript, checking it for style and marking it for the printer, a Copy Editing Department, first under B. F. Boardman and later under Ruth Christman, was formed.

Personnel with previous editorial experience was recruited whenever possible, but such individuals were not readily available, and many in the department were without training in their new field. That they were able to surmount their numerous editorial problems so successfully is largely due to the excellent leadership and vast experience of Miss Christman in the fields of editing, printing and typography of technical books. In addition to its work on manuscript, the department was engaged in the reading of all galley proofs, the transmittal to the printers of authors' corrections, and the reading and checking of page proofs. The total of 21,000 pages for the 70 volumes will afford some idea of the magnitude of the editorial task.

In the meantime, the Art Department, under Carl B. Holmes, was operating in high gear on the more than 30,000 figures selected by volume editors as illustrations for the text of the STRs. It was found that 80 per cent of this art work was not in suitable condition for reproduction as submitted; some were redrawn entirely, others relettered or otherwise touched up. Backgrounds and other irrelevant details in photographs were blocked out, and emphasis given to the important features of the device or equipment to be portrayed. At its peak, the Art Department numbered fifteen persons; by the end of 1946 its work was substantially completed and it was disbanded. The original pieces of art were eventually shipped to the Historical Records Section of the Adjutant General's Office in Washington, except in cases where they were on loan and had to be returned to the lending agency.

It was evident that in order to furnish easier access to the enormous amount of technical information in the STR, good subject indexes were essential. The Indexing Department undertook this assignment, and, in addition, consolidated all the individual volume index material, comprising over 60,000 entries, into the Master Subject Index Volume. SRG was fortunate in having the services of C. B. Ellis, and later of Beatrice Lawrence to head the department in this work, which entailed so much careful and detailed organization.

In addition to the production of the STRs, SRG was charged with the responsibility of making a permanent and accessible record of the more than 15,000 NDRC reports and other reference material which is listed in the STR bibliographies. Accordingly, a Microfilm Department under the able direction of

J. P. Sondheimer was organized to index and record this material on 35 mm microfilm, of which negative copies have been made available to the Army, the Navy, and the Library of Congress. The Microfilm Index appears in a separate volume in the STR series.

The Production Department, with W. A. Bayless, Jr. as Production Manager, was charged with the responsibility of routing and checking all the STR as it proceeded through the various phases of the flow chart from manuscript to galley and from page proof to bound volume. Even with the delivery of a completed book to the Services. SRG's obligations were not ended, for each piece of manuscript, galley, and page proof, each original figure and engraver's cut must be accounted for and disposed of in accordance with previous arrangements with OSRD and the Services, and with the existing security regulations. In addition to these routine functions, this department found itself charged with the task of conducting many transactions with the printers, engravers and binders. In fact, in order to expedite to the utmost publication of the STR volumes, the SRG Production Manager was obliged to devote a great deal of time to follow-up work, making constant trips to the various establishments involved. It is to his great credit that he was able to maintain constant watch over these outside problems while still attending to the efficient operation of his department.

In concluding this outline of the functions of the various departments of SRG, mention must be made of the Administrative Department, headed by Betty Hofstadter, Administrative Assistant. This unit's difficulties were enhanced by the unusually rapid turnover in SRG personnel resulting from the temporary nature of the work. However, it succeeded admirably in handling all personnel problems, in addition to those of payroll, property, records, files, and a number of other important details essential to a smooth-running organization. Some credit for this must be given to the Business Office of the Government Contract Division of Columbia University, whose cooperation throughout the project was invaluable.

While it is not the purpose of this foreword merely to present a series of excuses for the time delays incurred in the production of the seventy STR volumes, it is believed that an objective analysis might prove useful. As already mentioned, SRG made mistakes, and lessons have been learned. Then surely no one is in a better position than SRG itself to offer construc-

tive answers to the question: Why has it required more than three years to complete a project originally estimated to require fifteen months?

Obviously, many miscalculations were responsible for this first optimistic estimate. Some of the delays in schedule resulted indirectly from the ending of the war, and in surveying the work of SRG, it might be well to deal with these delays first. The return to peacetime jobs of almost all of the NDRC research workers who were required to contribute to the STR can be blamed for serious time lags in the preparation of the manuscript. No man involved with the personnel problems of transferring to a post-war industrial or academic career, in many cases necessitating a change in domicile also, can be expected to devote many hours a day to the writing of technical reports. It was possible for SRG to compensate most of these authors for their work by putting them on the payroll, after they had severed their connections with OSRD, but nevertheless, the average time lag in the delivery of completed monuscript was four months after the promised delivery dates; in two cases, it was ten months late.

Not only was manuscript delayed, but its quality was impaired by the confusion of the post-war transition. For the preparation of material as technical and as full of mathematics and chemical formulae as the STR, time, office facilities and skilled assistance are needed, or the manuscript cannot be considered in fit condition for transmittal to the printers. This unfortunately, was the case with much of the STR text, and thus time and expenses were required later to rectify errors that had crept into galley and even page proof.

It is to be regretted that those responsible for the STR manuscript could not have begun sooner on this work, and that they could not have been retained in a full-time capacity on the OSRD payroll until their responsibilities in this connection had been fulfilled. In this way, they would have had access to adequate clerical assistance under a centralized control, and they would not have been exposed to so many diversions from outside sources.

For the technical reading of galleys, however, it would not be necessary to retain personnel in OSRD. It was the experience of SRG that this can be considered a spare time assignment and can be done concurrently with other work; it was only necessary to put such readers, in most cases the authors themselves, on the SRG payroll and reimburse them on an

hourly basis. With some exceptions, division readers were very prompt in returning to SRG the proofs sent them. They were usually given two weeks in which to read galleys and check cut dummies; stamped and addressed envelopes were enclosed to facilitate return, and a set of proof-readers' conventions also included. In the cases where material was not returned promptly, it was generally found that the readers had not been asked by the volume editor to do this work in the first place. SRG has learned that it is advisable to obtain a written commitment from a reader, at the time he is nominated, that he will be willing to read proof promptly when it is sent to him.

Undoubtedly the most serious single delay factor in the project was the condition of the printing industry during the post-war period. Inundated with work which had been shelved during the war years, short of skilled operators, equipment and materials, the printing houses of the nation were hard-pressed to satisfy the demands of their regular customers, and were not eager to undertake outside work of a temporary nature. Owing to their lack of experience and equipment for setting copy of a technical character, some of the printers working for SRG had difficulties with the many highly complex equations and formulae in the STR. This led to production delays; in some cases it was necessary for SRG to return page proof three or four times before it was in correct form.

Obviously, if a similar project is to be undertaken in the future, the most desirable arrangements would be to deal with one printing establishment only, and that one to be experienced in working with scientific material. Perhaps the most satisfactory solution of the production problem would lie in the adoption of a photo-offset printing method, by which manuscript is prepared on special typewriters and is reproduced in that exact form by photo-offset. Some clarity and detail would probably thus be lost in the halftone figures, but an immeasurable saving would be effected in time and expense by eliminating the necessity for proof reading and checking procedures once the final manuscript had received approval. Needless to state, this method was given serious consideration during the early stages of SRG. However, due to the shortage of both equipment and experienced operators, it was found impractical at that time.

Difficulties caused by classification were encountered throughout the project. During the early phases, it had been hoped and expected by OSRD that approximately one-third of the volumes would be de-

classified in their entirety before going to press, and consequently could be made available to the public. But during 1946 and 1947 the policy of the Services became increasingly conservative; in the case of some volumes, they actually raised the classification from a lower one. Eventually, only eight volumes were given clearance by the Joint Review Board and could be printed as open literature.

A final problem for SRG was found in the selection of its own staff. Persons with a variety of backgrounds were sought: scientific, editorial, artistic, typographic, librarian, printing—to name only some, but at a time when everyone was seeking a permanent position, SRG did not have very much to offer but a temporary though interesting and important assignment. It should reflect to the great credit of those who elected to remain with the project for as long as they were needed, and worked so conscientiously to ensure that the STR appear in as satisfactory a condition as possible.

Credit is also due to those ex-members of the divisions, committees and panels of NDRC who gave freely of their time in serving as technical editors. In some cases, they showed an interest in their volumes up to the very last, in spite of their preoccupations with other affairs, and were always ready to render advice and assistance when requested by SRG. Unquestionably, in the instances where such cooperation was given, it can clearly be seen in the quality of the completed volumes.

During the final period, the Director was able to spend less and less time on the project and Dennis Puleston, Assistant Director, took on more and more responsibility for the management of SRG. Great credit is due him for the able and patient way in which he steered the group through the many terminal difficulties.

At Columbia University Press, Mr. Melvin Loos should be mentioned for the special help he gave to SRG. A lifetime's experience in the publication of technical works enabled him to afford valuable advice on questions of style and format, and he worked ably as a contact between SRG and the printing houses with which the STR work was allocated.

Acknowledgements must also be made to H. M. Chadwell, L. H. Farinholt, E. W. Scott, Cleveland Norcross and R. C. Bowker for the very valuable assistance they gave to the project while acting as OSRD Scientific Officers and Contracting Officers. It would have been impossible to operate effectively

without having SRG interests represented by them in Washington. On problems concerning the contract and its amendments, the classification of STR material, and the distribution procedures for the volumes, the support of these men was particularly notable.

In conclusion, appreciation must be expressed to Dr. Bush for the vital interest he has taken in the project. By fostering the idea from its conception and in following it through to its conclusion, he should be accorded the ultimate credit for all the seventy Summary Technical Report volumes, with their wealth of technical information so essential, in the Nation's interests, to future scientific research.

WALLACE WATERFALL
Director SRG



INTRODUCTION

This volume provides an alphabetical index to the information contained in all of the 68 Summary Technical Reports of NDRC. This index is followed by a listing of the chapter headings for each Report, and the roll of all personnel who served with OSRD from its inception in 1940 to its close in 1947.

The Microfilm Index volume, being self-contained, is the only Summary Technical Report not included in this index.

The arrangement of this index is conventional, requiring no highly technical background on the part of the user. The following abbreviations are employed to refer to the Panels and Committees of NDRC:

Panel or Committee	Abbreviation				
Applied Mathematics Panel	AMP				
Applied Psychology Panel	APP				
Committee on Propagation	CP				
Tropical Deterioration Committee	\mathtt{TD}				

These abbreviations are used as illustrated: A scope, radar, Vol. APP-2: 235-246; Vol. 14–2: 31 where Vol. APP-2: 235-246 refers to pages 235-246 of Volume 2 of the Applied Psychology Panel. The Divisions of NDRC are designated numerically. Thus in the above example, Vol. 14-2: 31 refers to page 31 of Volume 2 of Division 14. For a complete listing of the Divisions and of the Panels and Committees of NDRC, see page iv.

The direct compilation of this volume was the responsibility of the Indexing Department of the Summary Reports Group. But as the key to the entire Summary Technical Reports series, this volume is essentially the co-ordinated enterprise of all of the various Divisions, Panels, and Committees of NDRC.

BEATRICE M. LAWRENCE Editor



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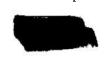
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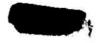
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^a For facility of handling, this Summary Technical Report of Division 9, Volume 1, has been bound and published in two sections. The first section contains Part I and Part II of Volume 9-1. Parts III—VI are found in the second section, together with the Glossary, Bibliography, OSRD Appointees, Contract Numbers, Project Numbers, and Index, all of which are applicable to both sections of Volume 9-1.

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NDRC Chief & Dpty Chief Sec 16.5 Div 16. Mbr Sec C6
Div C; Sec 16.2 Div 16; Div 16; Sec 12.1 Div 12

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FOWLER, GLENN A.

NDRC Conslt Sec D1 Div D

FOWLER, ROBERT D.

Conslt S-1 Exec Comm

NDRC Conslt Sec B3a Div B; Div 9. Mbr Scc B3d Div B

FOWLER, WILLIAM A.

NDRC Conslt Sccs H, T, X Div A

Fox, Robert A.

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NDRC Mbr Engineering Panel. Tech Aide Divs F & 15

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Spec Conslt to OSRD Director

FRANK, ROBERT L.

NDRC Conslt Sec B3a Div B

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NDRC Conslt Div B

FRASER, LORENCE W.

NDRC Conslt Sec T Div A

FRENCH, HARRY F.

Conslt Sec T

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FROST, ELIZABETII B.

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NDRC Conslt Sec A Div A; Div 1

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OSRD Mbr Advisory Council

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NDRC Tech Aide & Conslt Sec B7 Div B. Mbr Sec 11.1 Div 11

FUSON, REYNOLD C.

NDRC Conslt Div 9

FYE, PAUL M.

NDRC Conslt Div 2

GAINES, JOHN M.

NDRC Conslt Sec B7b Div B

GAITHER, H. ROWAN

NDRC Conslt Engineering & Transition Ofc

GANNETT, DANFORTH K.

NDRC Conslt Sec CI Div C

GARDNER, EARL B.

OFS Contr Employee

GASKILL, HAROLD V.

NDRC Conslt Sec D2 Div D



GASSER, HERBERT S.

NDRC Chmn Secs B4, B4a, B4b, B4c Div B. Mbr Secs A3, A4, B3b Div B; Div 9

GATES, MARSHALL

NDRC Tech Aide Div 9

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NDRC Conslt Div B; Secs A3, B3b Div B; Div 9. Mbr Sec B4a Div B

GELOTTE, ERNEST N.

NDRC Conslt Sec B Div A

George, Roscoe H.

NDRC Mbr Div 13

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NDRC Tech Aide Scc D2 Div D; Sec 7.5 Div 7; Applied | Goudey, R. F. Math Panel

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NDRC Conslt Sec A Div A

GILLET, H. W.

NDRC Mbr Div 18

GILLILAND, EDWIN R.

NDRC Dpty Chief Div 11. Mbr Sccs L12, B7b Div B; Div 11. Conslt Sec 11.1 Div 11

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NDRC Conslt Sec D1 Div D; Div 14. Mbr Div 15

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NDRC Mbr Secs A1, A2, B3a Div B. Conslt Div 9

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NDRC Conslt Div 14

GLARUM, SIVERT N.

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GLENNAN, T. KEITH

NDRC Conslt Sec C4 Div C; Div 6

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NDRC Conslt Sec H Div A; Div 3

GODFREY, THEODORE B.

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GOFF, HOWARD B.

NDRC Tech Aide Div 11; Sec 11.1 Div 11

GOLDSMITH, CLARENCE

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GOLDSMITH, LESTER M.

NDRC Mbr Sec C2 Div C; Div 12

GOOD, WALTER A.

NDRC Conslt Div A

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NDRC Tech Aide Divs 16, 17

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NDRC Conslt Secs A. B. T Div A; Divs 1, 2

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NDRC Mbr Sec B3d Div B. Conslt Div 9

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NDRC Conslt Sec Bla Div B

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NDRC Tech Aide Secs B5, B6 Div B. Mbr Secs L11, B6
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NDRC Conslt Secs E. T Div A; Div 4

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NDRC Conslt Sec B3c Div B; Div 9. Mbr Coordination of Test Methods Subcomm Tropical Deterioration Admin Comm

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NDRC Conslt Div A: Sec B Div A

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NDRC Conslt Div D; Div 14

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NDRC Mbr Scc 5.3 Div 5. Conslt Div 5

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NDRC Chief Sec 16.3 Div 16. Chmn Sec C8 Div C. Mbr Sec C6 Div C; Div 16; Sec 12.1 Div 12; Sec 16.5 Div 16. Conslt Div D

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NDRC Tech Aide & Conslt Sec 4 Div C. Mbr Div 6

HARRINGTON, W. F.

NDRC Conslt Div B

HARRIS, DONALD B.

NDRC Tech Aide & Conslt Div 15

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NDRC Tech Aide Divs 1, 3

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NDRC Conslt Scc A4 Div B; Div 9. Mbr Scc B4c Div B

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NDRC Conslt Sec A3 Div B

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NDRC Conslt Sec B6 Div B; Div 10

HAZELTINE, ALAN

NDRC Mbr Div 13

HAZEN, HAROLD L.

NDRC Chief Div 7. Conslt Sec D Div D; Div D

HEARON, ROBERT J.

NDRC Tech Aide Propagation Comm

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Conslt Scc T

NDRC Conslt Sec T Div A

HEIDELBERGER, MICHAEL

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HEIMSCH, CHARLES

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NDRC Conslt Sec Cl Div C; Sec 13.7 Div 13

HELLERMAN, L. L.

NDRC Conslt Sec B4c Div B; Div 9

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NDRC Conslt Div A; Secs E, T Div A

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NDRC Conslt Sec B4c Div B

HERON, S. D.

NDRC Mbr Div 18

HERRING, CONYERS

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HERRIOTT, WILLIAM

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NDRC Conslt Secs A, H Div A; Div 3

HEYROTH, FRANCIS

Conslt S-1 Exec Comm

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NDRC Conslt Div 10

HINMAN, W. S., JR.

NDRC Spec Asst to Chief Div 4. Conslt Sec E Div A; Div 4

HIRSHFELDER, JOSEPH O.

NDRC Conslt Secs A, H Div A; Div 3; Div 1

HOBART, GARRET A., III

NDRC Conslt Sec D1 Div D

HOBBS, FREDERICK T.

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HOBBS, M. E.

NDRC Conslt Scc B Div A

HOCHWALT, CARROLL

NDRC Conslt Sec Bld Div B. Mbr Sec 8.1 Div 8

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NDRC Mbr Sccs L3, C3, B9b Div B; Div 19. Conslt Secs B3b, B4c Div B

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NDRC Conslt Div B; Div 9

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NDRC Mbr Sec 7.2 Div 7

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OES Tech Aide Patent Div

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NDRC Mbr Secs Al, Bla Div B; Sec 8.1 Div 8

HOLZER, ROBERT E.

NDRC Conslt Div A; Sec T Div A

HOOVER, CHARLES R. (deceased)

NDRC Conslt Div B. Mbr Sec B7d Div B

HOPGOOD, ROY C., JR.

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NDRC Spec Asst to Chief Sec 17.1 Div 17. Tech Aide Sec D3 Div D

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NDRC Mbr Sec 7.6 Div 7

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NDRC Chief Scc 11.3 Div 11. Mbr Sec B7b Div B; Secs 11.2, 11.3 Div 11; Div 11. Conslt Sec B7d Div B

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NDRC Chmn Sec L8 Div B. Conslt Sec A Div A; Div I

HOUGHTON, HENRY G., JR.

NDRC Mbr Sec D4 Div D; Sec 16.4 Div 16. Conslt Sec 16.4 Div 16; Div 10

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OES Patent Advisor Patent Div (assigned to Spec Proj)

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NDRC Conslt Sec T Div A. Mbr Sec 17.2 Div 17

HUBBLE, E. P.

NDRC Mbr Div 3

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NDRC Conslt Sec T Div A; Div 15

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NDRC Mbr Scc Al Div B. Conslt Div 9

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NDRG Mbr Sec Cl Div C; Sec Dl Div D; Div 14. Conslt Sec Cl Div C

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JACOBS, MORRIS B.

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JACOBS, WALTER A.

NDRC Conslt Div 9

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NDRC Conslt Sec E Div A

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JOHNSON, KENNETH S.

NDRC Conslt Sec Cl Div C

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NDRC Mbr Sec D3 Div D. Conslt Sec 17.2 Div 17

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NDRC Chmn Sec B3b Div B. Conslt NDRC; Secs A4, B4a Div B; Divs 9, 10. Mbr Sec B3a Div B

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JONES, FRANK L.

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NDRC Tech Aide Chmns Ofc; Div 18

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NDRC Conslt Sec C2 Div C. Admin Aide Div 12

KARRER, SEBASTIAN

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NDRC Gonslt Sec T Div A; Divs A, 1. Spec Asst to Chief Div 4; Tech Aide Div 4

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NDRC Mbr Sec C5 Div C; Sec 17.3 Div 17; Div 6. Conslt

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NDRC Conslt Scc 16.3 Div 16

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CMR Tech Aide CMR; Sec 1 Div Chemistry

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NDRC Mbr Sec A3 Div B. Conslt Sec B3b Div B

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NDRC Conslt Applied Math Panel

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NDRC Tech Aide Sec H Div A; Sec H Div 3. Conslt Sec H
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KRACEK, FRANK C.

NDRC Conslt Sec A Div A

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NDRC Mbr Sec B7d Div B. Constt Div 10

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NDRC *Mbr* Sec B10 Div B; Sec 11.3 Div 11. *Conslt* Sec 11.3 Div 11

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NDRC Mbr Secs L3, L1, B5 Div B; Div 10. Conslt Div 10

LAMPSON, CURTIS W.

NDRC Conslt Sec B Div A; Div 2. Mbr Div 2

LAND, EDWIN H.

NDRC Conslt Divs 2, 5

LANDIS, CARNEY

NDRC Conslt Sec C5 Div C; Sec 17.3 Div 17

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NDRC Mbr Secs L1, B5 Div B. Conslt S-1 Sec; Div 10

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NDRC Tech Aide & Conslt Div 15

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NDRC Constt Sec D1 Div D

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NDRC Mbr Sec D1 Div D; Sec C4 Div C; S-1 Sec; Div 14

LAWSON, JAMES L.

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LAWSON, W. E.

NDRC Conslt Secs A, B9a Div B; Divs B, 2; Sec B Div A.

Mbr Divs 2, 8

LAWTON, ELLIOTT J.

NDRC Conslt Sec T Div A

LAZIER, WILBUR A.

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NDRC Conslt Sec C2 Div C; Div 12

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NDRC Tech Aide Sec B9 Div B

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NDRC Mbr Secs B8a, L4 Div B

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NDRC Chmn Sec M. Mbr Secs L9, B8c Div B; Div 1

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NDRC Chmn Scc L10 Div B. Conslt Sec 11.1 Div 11; Div 11. Mbr Sec B7b Div B

McAllister, Edward D.

NDRC Conslt Sec T Div A

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NDRC Mbr Sec B3d Div B. Conslt Div 9.

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NDRC Conslt Sec A Div A; Div I

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NDRC Vice Chmn Secs L11, B6 Div B. Conslt & Mbr Div

10

McClean, Joseph F.

NDRC Alt Mbr Vacuum Tube Development Comm. Tech Aide Sec Cl Div C; Divs 13, 15

McClintock, Miller

NDRC Mbr Sec C6 Div C

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NDRC Conslt Sec H Div A; Div 3

McClure, HARRY B.

NDRC Conslt Sec 8.2 Div 8

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NDRC Mbr Sec D-M Div D

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NDRC Gonslt Secs A4, B4a Div B; Div 9

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NDRC Conslt Secs E, H Div A; Divs 3, 4

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McMath, Robert R.

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NDRC Tech Aide Div 17

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NDRC Tech Aide. Chmn Secs B3, B3a Div B. Conslt Div B. Mbr Secs A1, A2, B3d Div B; Div 9

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NDRC Mbr Sec 12.1 Div 12; Sec 16.5 Div 16

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NDRC Tech Aide Div 18

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Conslt Divs C, D; Applied Math Panel. Mbr Sccs
C4, C5 Div C; Sec 17.3 Div 17; Sec 6.1 Div 6;

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NDRC Conslt Sec B7b Div B; Sec II.I Div II

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NDRC Tech Aide Chmns Ofc; Sec Cl Div C; Divs 5, 13

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NDRC Conslt Div 2

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Secy Publications Comm; Contr Scttlement Review

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NDRC Conslt Sec A Div A; Div 1

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NDRC Constt Sec A4 Div B; Div 9. Mbr Div B4c Div B.

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NDRC Constt Secs A3, B3b Div B

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NDRC Mbr Scc Al Div B. Conslt Secs Bl, B2a, B2 Div B

OLSHEN, ABRAHAM C.



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NDRC Conslt Sec L11 Div B; Div B; Div 10

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6.1 Div 6: Div 6

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NDRC Tech Aide Sec 5.5 Div 5

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NDRC Tech Aide Secs B5, B7, B8 Div B; Secs 11.1, 11.2 Div 11; Div 11

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Mbr Secs L4, B3c Div B. Conslt Divs 9, 19

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NDRC Mbr Sec X; Div 5. Alt Mbr Div 15

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NDRC Divs 5, 17; Applied Math Panel)

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NDRC Mbr Sec B10 Div B; Sec 11.3 Div 11

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NDRC Conslt Div A. Mbr Sec 7.6 Div 7

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NDRC Conslt Div 10

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NDRC Conslt Sec D1 Div D; Div 14



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NDRC Conslt See H Div A; Div 3; Applied Math Panel

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NDRC Conslt Div A; Sec B Div A

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NDRC Mbr Div 7; Secs 7.2, 7.6 Div 7

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NDRC Chief Div 11. Chmn Sec B10 Div B. Mbr Secs B7b, B9c Div B; Div 11

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